Montana
Office of Public Instruction
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Science Model Teaching Unit Bitterroot Adaptations and Salish Traditions

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Grade 4

Stage 1 Desired Results

Established Goals

Montana Science Content Standard 3: Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment**.**
Benchmark 4.l: Identify plants … have structures, and systems that serve different functions for growth, survival, and reproduction.
Benchmark 4.3: Describe and use models that trace the life cycles of different plants and discuss how they differ from species to species.

Essential Understanding 1: There is great diversity among the 12 tribal Nations of Montana in their languages, cultures, histories and governments. Each Nation has a distinct and unique cultural heritage that contributes to modern Montana.

Understandings:

Students will understand…

- careful observation can be used as a vital scientific tool to study plant adaptation.
- Bitterroot's unique adaptations for survival.
- the Salish People's comprehensive knowledge of the Bitterroot.
- why the Salish revered the Bitterroot and its properties.
- the importance of respect for Salish knowledge of native plants.
- plants are essential to our human survival.

Essential Questions:

- How do some Salish people study plants?
- How do some scientists study plants?
- How would you find out more about the Bitterroot?
- How do plants adapt to the environment they live in?
- How does understanding plants help you today?
- Why do you think Indians honored certain plants?
- How does knowledge about plants affect your life in your community?

Students will be able to…

- explain (written or orally) why recorded observation is a legitimate tool of scientific inquiry.
- create a chart, with a partner, listing bitterroot plant parts, plant needs, adaptation indicated, evidence for adaptation *see sample teacher chart.

Students will know…

- observation is a legitimate tool of scientific inquiry.
- an adaptation is a process that helps a plant meet its needs in its environment.
- how to make logical deductions based on anecdotal evidence and understanding of plants.

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- create and present an artistic product symbolizing a respectful understanding of Salish Bitterroot tradition.
- write a letter explaining their opinions concerning the survival of the Bitterroot.

Stage 2 Assessment Evidence

Performance Tasks

- Keep a recorded journal of important information about Bitterroot plants.
- Create a chart, with a partner, listing bitterroot plant parts, plant needs, adaptations, why you think this is an adaptation, know (evidence) *see sample teacher chart.
- Create and present an artistic product symbolizing your feelings and understandings about the Bitterroot.
- Write a letter to the Governor expressing your opinions concerning the survival of the Bitterroot.

BITTERROOT PLANT UNIT EVALUATION Name_____

	0-7 pts	8-16 pts	17-25 pts
Individual Journal 25 pts	Difficult to read Most of the information is confusing Uses 1 source	Readable Some of the information is confusing Uses 2 sources	Neat Accurate Information Uses 3 sources
Adaptation Chart with Partner 25 pts	Difficult to read Headings Records confusing Adaptations are not logical	Readable 4 headings 8-16 entries 2-3 adaptations listed with logical support	Neat 4 headings 18-24 entries 4-6 adaptations listed with logical support
Artistic Product 25 pts	Quick, sloppy Exhibits minor know-ledge of the Bitterroot	Average effort in construction Not unusual Exhibits minimal know-ledge of the Bitterroot	Carefully constructed Unique and creative Exhibits knowledge of the Bitterroot
Letter To Governor 25 pts **<u>Student's Score</u>** **Individual Journal __** **Adaptation Chart __** **Artistic Product __** **Letter to Governor __** **Total (100 pts) __**	Spelling or handwriting make it difficult to read No opinions listed No support included	Readable Lists 1 opinion about Bitterroot survival Minimal support included	Neat Lists 1 opinion about Bitterroot survival Excellent support for opinion reasoning

Student Self Evaluation **Name**_____

1. What parts of the assignment did you do well?

2. What parts were hard for you?

3. What did you do to help yourself when things were hard or you didn't understand?

4. What are at least two things you learned from this unit?

Stage 3 Learning Plan

Prior Knowledge: Basic plant structure and function are concepts that are needed prior to engaging students successfully in this lesson.

Day 1

1. Teacher passes out a copy of the following scenario; read together as a class:
   "*You are a botanist (a plant scientist.) Your task for this unit is to solve the mystery of the Bitterroot. The Governor and Salish Indian Leaders are concerned we may be in danger of losing our state flower, the Bitterroot. You are working with the Fish, Wildlife and Parks Department as well as the Confederated Salish and Kootenai Tribes (CSKT) to find out everything you can about the Bitterroot plant, its adaptations to its environment, why it is important to the Salish, and if it is endangered. Send your findings in a letter to the Governor. Be sure to include your opinion and support for whether the Bitterroot is in jeopardy of becoming extinct."*
2. Teacher leads discussion of key terms in understanding all plants:
   - What do we know about plants?
   - What are the three main parts of a plant? Leaves, stem, roots
   - What four things do plants need to live? air, water, nutrients, sunlight
3. Scenario discussion
   - What plant are you to study? Bitterroot
   - What are adaptations? Can you find it in the glossary of the science book? An adaptation is a body part or behavior that helps an organism meet its needs in its environment. For our purposes, it is a part of a plant (or process) that helps it meet its needs in its environment.
4. Discuss examples of adaptations. (If you are using Harcourt Science, use p. A74-75 & p. A80-81, Otherwise consult your science text.)
5. For a quick visual assessment, ask the students to write on a piece of paper at least one part of a cactus that shows adaptation (shallow roots, fleshy leaves full of water, etc.).

Day 2 (45 min lesson)

1. Students make a journal out of 4-6 half sheets of lined paper and two half sheets of construction paper for a front and back cover. Distribute the journal entries written by a Helena teacher about Bitterroot found around her home. (See attachment A) With the class, read through one entry and model entering important information in student journal. Give students 15-25 minutes to complete this task.
2. Students share with the class some of the information they wrote down, give other students the chance to revise if necessary.

Day 3 (45 min lesson)

1. Watch the DVD The Story of the Bitterroot, Section 3, "Botany"
   Focus: Have students list new facts they learned about bitterroot in their journal. Teacher may periodically stop DVD for students to take notes. When DVD is finished, teacher will summarize the facts identified by the student comments on the board. Students revise their journals as needed.

2. In a teacher led discussion, students brainstorm ideas to format the info they have journaled. (Example of chart follows)

Bitterroot Plant Parts and their Adaptations

Plant Parts	Plant Needs	Adaptation to the Environment	How Do You Know?
Roots	water nutrients	tap root to maintain energy in dry environment	plant will grow again with only a piece of root
Leaves	water	narrow, slender, needle-like minimizes evaporation	test leaves that peak out in spring
	sun, air	photosynthesis is occurring	leaves are green, only appear in spring
Flowers	reproduction	seeds in center in hard, thick shells	shells protect tender seeds

3. Using the information in their journals, the students prepare a completed chart with a partner, using the format established by the class discussion. Upon completion, share the work with another partner group. Each group should add any additional information they discover from the partner group they consult. You may have students compare with 1-3 other partner groups.

Day 4 (45 min lesson)

1. Watch DVD, The Story of the Bitterroot
   Focus: Salish Bitterroot origin story and the part the plant plays in their traditions. For a list of discussion questions, see the teacher's guide that accompanies the DVD.

Section 1, "The Legend of the Bitterroot"
Section 5, "When We Were Children"
Section 6, "Mr. Bitterroot"
Section 7, "The Gathering"
Section 8, "The Future"

2. Students will create and present an artistic product symbolizing a respectful understanding of Salish Bitterroot traditions (example: poem, painting, sculpture, collage).

Day 5 (45 min lesson)
Students will utilize writing skills by drafting a letter to the Governor of Montana about the Bitterroot and its future. They should include: reasons it's important to preserve the Bitterroot for Montanans, specifically including the Salish Indians, what the Bitterroot needs to survive, his/her opinion about the possible extinction of the Bitterroot with support for his/her reasoning.

MATERIALS AND RESOURCES NEEDED
The Story of the Bitterroot, DVD Historical Documentary distributed by OPI. Exceptionally researched, uses Native peoples' descriptions of their experiences, current-day botany evidence, how it became our state flower, how two cultures (whites/Indians) are coming together to keep the Bitterroot from disappearing. A copy should be in every school library. It has a lesson plan for 8th grade that accompanies it, but the DVD and Lesson Plan is age appropriate for 4th grade students. It is divided into sections that can be viewed separately at different times:
Legend of the Bitterroot
"Corps of Discovery"
Botany
The State Flower
When We Were Children
Mr. Bitterroot
The Gathering
The Future

Science Textbook unit on life sciences, plants section for basic needs, plant parts, and vocabulary [Ex: "Harcourt Science," Unit B, pp. A68-A87, (Attachment)]

Attachment A: OBSERVATIONS of a Helena Teacher about Bitterroots Growing by her Home

June, 2002 We are starting to build our new house on Lincoln Road. I'm there helping when I realize there are beautiful pink flowers blooming close to the ground. The day is hot, about 90 degrees and it's very dry. The soil is sandy and I recognize sage brush and some clumps of wild grass. I go get my plant field guide to wildflowers and I'm almost sure the pink flower is the Bitterroot. They are such a beautiful contrast to the dirt and dull color of the sage brush. That evening the flowers fold up into almost a bud shape. They bloom for only about a week and then all signs of them are gone.

June, 2003 Today I was walking to the edge of our lawn where the fields were still wild and I started watching for any sign of the bitterroots I had seen last year. After a few days I noticed some little clumps of "plump" needle-like leaves that came out from a central point like petals. They suddenly appeared where there had been no sign of them. I watched for about a week and the leaves die and in their place are pink cone-shaped buds. They bloom again for about a week and then everything disappears.

June, 2004 I am anxiously looking to see if the bitterroots appear again. They are such pleasant splashes of

color in the dry field. I keep watch and in about 2 weeks, the plump needlelike leaves appear from nowhere. It's a good thing they are all over the hillside because I can never remember exactly where to look. This year, however, I'm doing my Montana History unit right now and I want to show the kids a bitterroot. So I dig up a clump of leaves and plant it in a pot I have, keeping it outside until it blooms. Sadly, the leaves disappeared, no blooms appeared, and the plant dies.

June, 2005 I am approaching the bitterroot season sadly this year because I want so badly to show my students, but I couldn't get the plant to live. I still watch and in a week or two the plump needle-like leaves appear. Then they die and the buds appear. They blossom and in a week everything is over. So I take a picture of one of them to show my students.

In late June I decided to transplant some plants and I went to a pile of pots, grabbing the top one. Strangely, the pot underneath has dirt and a plant growing in it. I assume it's a weed and wonder how it could grow under another pot with no sun getting to it and no water except the snow from winter. Somehow it doesn't look like any weed I've ever seen. I leave it by the shed and continue my transplanting. A few days later I realize that pot was the one I had the bitterroot in. The plant had come back to life after a year of neglect. I planted it in my garden and it bloomed that year although it bloomed in late June instead of early June like the rest.

June, 2006 This yearly Spring watch for the bitterroot is becoming a pleasant anticipation. I'm excitedly watching the field. A few days later, the clump of green leaves appear—a few at first, then many. Still no flower buds have appeared. A week later, the buds are up and some are blooming. I head outside to take some pictures. They are so close to the ground, the sage brush almost hides them. At least I now have pictures to show my students.
About a week later, the blooms are dried up and blown away. No sign that the plants were ever there.

May, 2007 The bitterroot came early to the field this year—we did have a wetter spring. First the clump of leaves appear, then they disappear, the buds come and bloom.

July, 2007 The bitterroot in my garden still has leaves but it hasn't bloomed. By the end of July, the leaves have disappeared and buds are blooming. This is the latest I've ever seen this one bloom.